RESEARCH PROJECT SEGMENT

State: Alaska

Project No.: F-9-3 *Name:* Sport Fish Investigations of Alaska.

Study No.: G-II *Study Title:* Sport Fish Studies.

Job No.: G-II-E *Job Title:* Studies of Unique and Trophy Game Fishes.

Period Covered: July 1, 1970 to June 30, 1971.

ABSTRACT

Sport fish tagging, general inventory, and stream survey work was conducted in relationship to trophy game fishes on Funnel Creek, Moraine Creek, and three small lakes in the Alagnak River drainage. Rainbow trout, Salmo gairdneri, were sampled in Funnel and Moraine creeks and observed in two of three lakes surveyed.

To determine and evaluate streams supporting sport fish populations, a survey was conducted in Lake Iliamna tributary streams from September 17 to 28, 1970. Rainbow trout samples were collected and observations made in these tributary streams.

Rainbow trout tagging and sampling was conducted in Copper River during late August, and rainbow trout were captured. Observations indicate a downstream rainbow trout migration exists during late fall in this river.

Gibraltar River was surveyed for rainbow trout during September 27 and 28, 1970. Twenty-eight rainbow trout were captured. Predominate age classes were V and VI.

The rainbow trout catch was checked and effort data collected at Lower Talarik Creek during a 46-day period (August 26 to October 10, 1970). Three hundred two fishermen were observed and 244 checked to determine fishing effort and catch-and-release ratios. Hooking mortality studies

were conducted with fishing gear evaluated, including treble hook with lure, single hook with lure, and single hook with eggs. Fishermen's hook-and-release techniques were observed and discussed.

There were 484 rainbow trout sampled for age and length at Lower Talarik Creek. An increase in the average size of rainbow trout available to fishermen was observed as the season progressed. Sampling data indicated the larger rainbow trout are primarily maturing fish and the smaller fish immature.

Tagging data indicates a significant interchange occurs between streams within the Lake Iliamna trophy fish area.

RECOMMENDATIONS

1. Continue the rainbow trout trophy game fish study in the Kvichak and Alagnak (Branch) River drainages.

2. Expand the Lower Talarik Creek program by constructing a weir to aid in determining life history, migration patterns, growth rates, and angling induced mortality which are essential to understanding the trophy rainbow trout population in the watershed.

3. Continue a study of hooking related mortalities on rainbow trout at Lower Talarik Creek under conditions comparable to that of the sport fishery.

4. Continue to collect creel census information for harvest estimates, catch-and-release ratios, and total man-hours expended.

5. Continue to survey and evaluate streams that support rainbow trout on Lake Iliamna.

6. Conduct an economic evaluation study of the Lower Talarik Creek sport fishery to determine the monies expended to sport fish in this trophy fish area.

7. Survey, map, and set up sampling stations on Lower Talarik Creek for future spawning studies.

OBJECTIVES

1. To initiate a study of various characteristics associated with the management of designated trophy fish areas, including but not limited to:

   a. Effectiveness of existing regulations in maintaining present levels of trophy fish stocks, including:

      (1) Retention-release ratios of trophy species

      (2) Hooking-related mortalities of released rainbow trout

   b. Angler acceptance of existing regulations for trophy fishing areas.

2. To obtain an annual estimate of angler participation and harvest levels in trophy fish management areas.

3. To evaluate biological data reported in other parallel studies of managed trophy fish populations.

4. To provide recommendations for management regulations which will insure a continued acceptable trophy fish population.

TECHNIQUES USED

All fish captured for sampling and tagging were taken by hook and line by anglers in the sport fishery and by Department personnel.

Anglers were contacted for creel census information and retention-release ratios.

Standard fish lengths were measured to the nearest millimeter on rigid portable measuring boards.

Unanesthetized fish were tagged with blue tube-type anchor tags inserted by Floy (Dennison) FD-67 tagging guns.

Rainbow trout retained for the hooking mortality study were held in 8' x 10' x 4' wire-mesh holding pens and were observed for 30 days.

FINDINGS

Alagnak (Branch) River Drainage

Funnel and Moraine Creeks:

Sport fish tagging, general inventory, and stream surveys were conducted in relationship to trophy game fishes on Funnel and Moraine creeks from July 25 to 27, 1970. The terrain adjacent to these creeks is exclusively high rolling tundra, rising to the Aleutian Mountain Range. Small alder (Alnus sp.) and willow trees (Salix sp.) are found along creek beds and around lakeshores.

Funnel and Moraine creeks were surveyed at their confluence for rainbow trout, Salmo gairdneri. Fish were sampled in both creeks, as well as three small lakes, M-1, M-2, and M-3 (Figure 1).

A total of 23 rainbow trout were sampled in both creeks. The mean standard fork length of these fish was 495 mm and ranged from 347 - 656 mm.

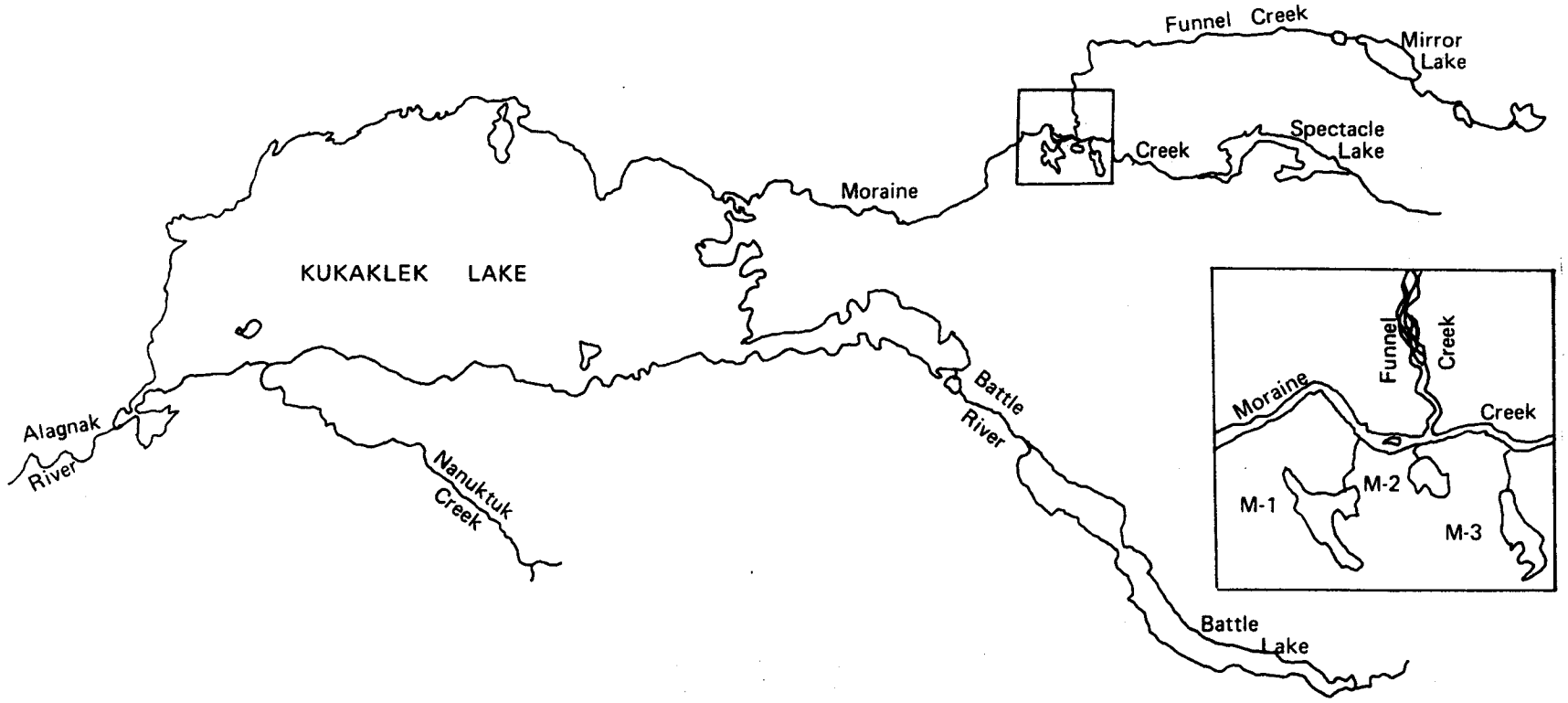

FIGURE 1 ALAGNAK (BRANCH) RIVER SYSTEM AND TRIBUTARIES.

Stomach analysis indicates rainbow trout in these streams during this period feed primarily on red salmon, Oncorhynchus nerka, eggs. Juvenile rainbow trout were found in Funnel Creek and in lakes M-2 and M-3.

Scale samples were collected from 23 fish, but 14 were regenerate. The age range of the remaining nine fish was from V - VIII years.

Kvichak River Drainage

Lake Iliamna:

A field survey to evaluate streams that may support sport fish populations in the Lake Iliamna drainage was conducted from September 17 to 28, 1970. Streams were surveyed by boat and foot. Distances surveyed depended upon stream appearance and terrain.

The survey was conducted in late fall to ascertain which streams are frequented by rainbow trout and attempted to determine which streams may be rainbow trout spawning streams in the spring. The creeks and rivers surveyed are listed in Table I.

TABLE I Streams Surveyed on Lake Iliamna for Sport Fish Populations, 1970.

Surveyed Area	Survey Date	Survey Observations*
Upper Talarik Creek	9/17	RT
West Eagle Bay Creek	9/18	No sport fish
East Eagle Bay Creek	9/18	No sport fish
Young's Creek	9/19	RT, AC
Chekok Creek	9/19	RT
Pedro Creek	9/20	No sport fish
Russian Creek	9/20	No sport fish
Lonesome Bay Creek	9/20	No sport fish
Komkok Creek	9/21	RT
Canyon Creek	9/21	No sport fish
Pink Creek	9/21	No sport fish
Pile Creek	9/22	AC
Iliamna River	9/23	RT, AC
Tommy Creek	9/25	RT at mouth
Copper River	9/25-26	RT, AC
Gibraltar River	9/27-28	RT

RT - Rainbow trout
AC - Arctic char

Three streams contained significant numbers of rainbow trout, these were the Copper, Iliamna, and Gibraltar rivers. Samples were collected on Copper and Gibraltar rivers, but due to limited time and access, only a few samples were collected on Iliamna River.

Copper River:

Copper River originates in the Chigmit Mountains of the Aleutian Range, close to the eastern side of the Alaska Peninsula. This river drains Meadows, Upper Copper, and Lower Copper lakes. A 32-foot waterfall is located approximately 12 miles upstream from the river mouth. This waterfall apparently limits the rainbow trout distribution, since rainbow trout are not reported upstream of this point.

Rainbow trout tagging and sampling was accomplished in Copper River during September 25 and 26, 1970. The mean length of the 41 rainbow trout captured was 458 mm. The sample range was 335 - 605 mm.

Ages IV, V, VI, and VII were represented in the 34 scale samples of the 41 rainbow trout sampled, and ages V and VI accounted for 73.5% of the samples.

A large number of rainbow trout were found schooled in the lower Copper River area on September 25, 1970. On the following day, the major portion of these fish had migrated out of the river and into Lake Iliamna. Tag recovery data also indicates Copper River rainbow trout migrate into Lake Iliamna.

Gibraltar River:

Gibraltar Lake lies south of Lake Iliamna near Kokhonak Bay and drains into Lake Iliamna via Gibraltar River. The river is approximately 5.8 miles in length. Gibraltar Lake has two major tributaries, Dream and Southeast creeks. Both streams contain spawning rainbow trout stocks, as does Gibraltar River.

Gibraltar River was sampled for rainbow trout with hook and line on September 27 and 28, 1970. Rainbow trout were sampled throughout the first two or three miles of the river.

The mean fork length of 28 rainbow trout captured was 484 mm and ranged in length from 337 - 580 mm. The 19 fish sampled represented age classes IV, V, VI, and VII, with ages V and VI accounting for 89.4%. The growth rate of these fish was comparable to Copper River fish. Both Gibraltar River and Copper River rainbow trout appear to be slower growing, as indicated from scale pattern, than Lower Talarik Creek rainbow trout.

ower Talarik Creek

atch and Effort:

Catch and effort data were collected from August 26 to October 10, 970, on Lower Talarik Creek. Three hundred two fishermen were observed uring this 46-day period, with 244 (80.8%) of these fishermen checked to letermine fishing effort and catch and release ratios (Table 2).

ABLE 2 Weekly Retention-Release and Catch Per Unit of Effort Data from Creel-Checked Sport Fishermen at Lower Talarik Creek, 1970.

Weekly Period	No. Fishermen Observed	Checked	%	Tot. Hrs. Fished	No. Fish Caught	% Fish Released	CPUE
3/26-30	18	16	(88.9)	82.5	21	95.2	0.25
3/31-9/6	78	59	(75.6)	410.5	47	29.8	0.11
9/ 7-13	54	43	(79.6)	215.5	163	89.6	0.76
9/14-20	45	40	(88.9)	226.0	115	80.9	0.51
9/21-27	35	25	(71.4)	138.0	113	85.8	0.82
9/28-10/4	58	49	(84.5)	206.0	125	82.4	0.61
10/5-11	14	12	(85.7)	37.0	16	50.0	0.43
Totals	302	244	(80.8)	1,315.5	600	80.2	0.46

A total of 1,315.5 man-hours were expended by the 244 anglers sampled o catch 600 rainbow trout. One hundred nineteen rainbow trout (19.8%) ere retained, with the remainder released. Seasonal catch per unit of ffort was 0.46 rainbow trout (Table 2).

looking Mortality Studies:

Rainbow trout hooking mortality studies were conducted at Lower Talarik reek between July 5 and 31 and September 12 through October 6. Fishing ear evaluated was: treble hook with lure, single hook with lure, and ingle hook with eggs. Two other studies with single hook and eggs were nitiated, but high water caused their termination. Captured fish were laced in a portable holding pen and later transferred to a permanent live en. All fish were held in the live pen approximately 30 days and checked aily for mortalities (Table 3).

TABLE 3 Hooking Mortality Study Conducted with Various Lures by Time Periods and Percent Mortalities by Group, Lower Talarik Creek, 1970.

Time Period	Mortality by Type of Gear: Treble Hook With Lure	Single Hook With Lure	Single Hook With Eggs
Start (No. Captured)	+44	+56	+30
1 Hour	-5	-2	-4
24 Hours	-3	--	-2
48 Hours	--	--	--
3-10 Days	--	-1	--
10-20 Days	-1	--	--
20-31 Days	-1	--	-1
Finish (No. Surviving)	+34	+53	+23
Percent Mortality	22.7	5.4	23.3

Results of the tests were as follows:

Treble Hook with Lure: Forty-four rainbow trout between 185 and 355 mm were collected on lures with treble hooks. Mortality of this group appeared to result from damage to the gill arches by one or more hooks. Total mortality in this group was 10 fish (22.7%).

Single Hook with Lure: Rainbow trout from 200 - 350 mm were captured on lures with single hooks. Of the 56 fish captured, three mortalities were recorded for a 5.4% group mortality. Two of the three mortalities were from hooking in the gill arch area.

Single Hook with Eggs: Thirty rainbow trout, between 263 and 726 mm were captured with single hook and cluster eggs. The line was cut six to eight inches outside the mouth of deeply hooked rainbow trout for immediate recognition in case of mortality. Mortality was seven fish (23.3%) in this group.

Observations: Minimal handling of fish by Department personnel during the study may have biased the results, as anglers do not always use preferred hook-and-release techniques. Their techniques varied from excessive handling to using some of the more preferred hook-and-release techniques.

Sampling indicated that greater hooking mortality occurred in: the first twenty-four hours, fast current, wind, and turbid water conditions. Angler attitudes, attentiveness, and abilities also enter into a hooking study. These factors are difficult to evaluate.

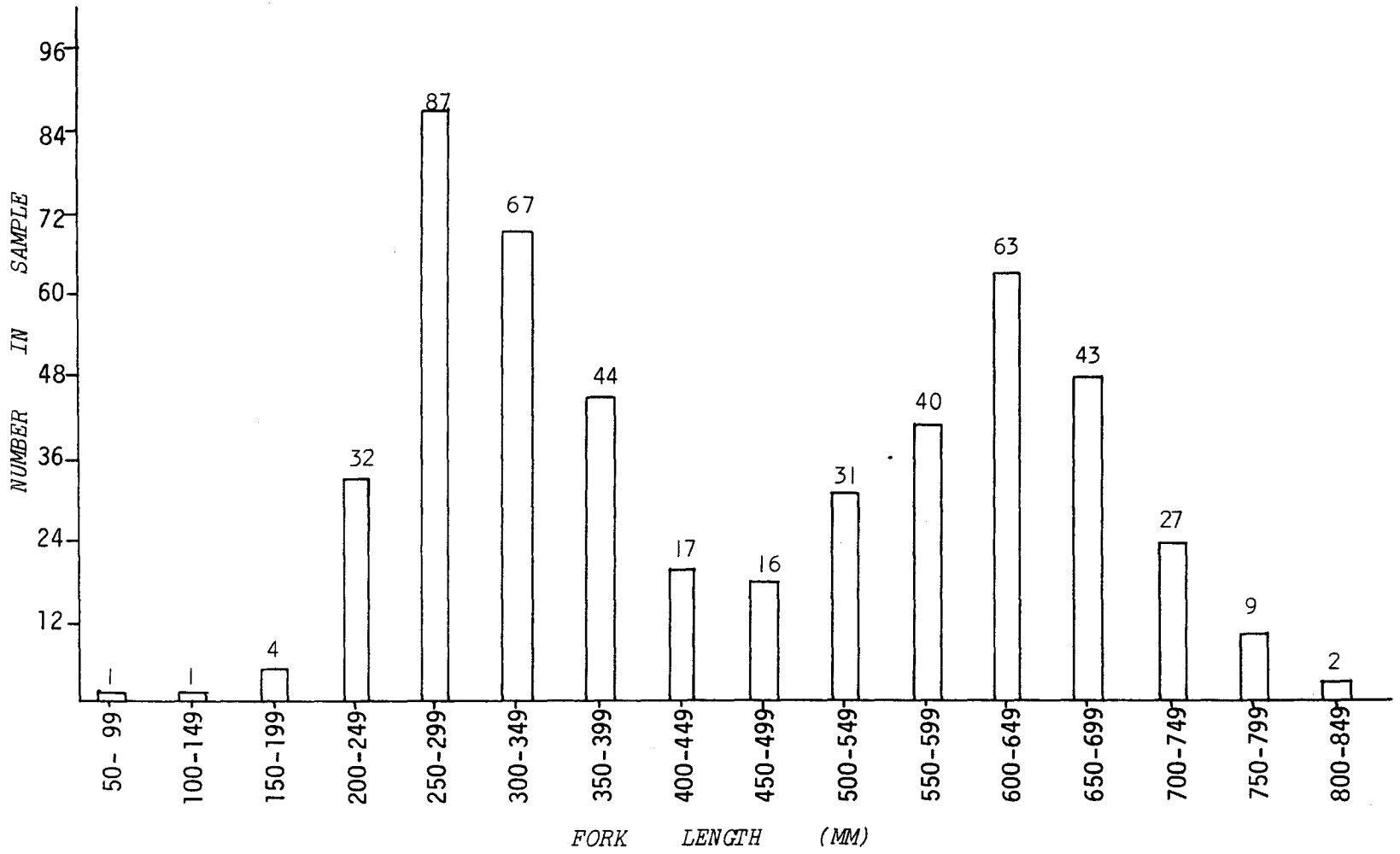

FIGURE 2 LENGTH FREQUENCY OF SPORT-CAUGHT RAINBOW TROUT, LOWER TALARIK CREEK, 1970.

Angler-induced hooking mortality is difficult to find on Lower Talarik Creek, due to stream geography. Some dead fish, attributed to hooking mortality, were found, but it is felt that other fish died in areas where detection was impossible, i.e., a grassy lagoon or Lake Iliamna.

Although a study was not conducted with flies, fish were readily caught on flies, except during windy or cold weather. During these periods, lures were more effective. It was apparent that rainbow trout were easily captured with eggs.

The terminal gear used by 104 fishermen consisted of: flies, 48%; eggs, 28%; and lures, 41%. Fishermen using more than one type of terminal gear were accredited with using each type.

Catch Sampling:

Rainbow trout catch sampling was conducted throughout the 46-day period at Lower Talarik Creek. There were 484 rainbow trout sampled, ranging from 95 - 830 mm (Figure 2). It appears that fish ranging from 400 - 500 mm are not abundant in the fishery and may migrate into Lake Iliamna.

Two groups of fish appear to be present in the fishery at Lower Talarik Creek: small fish from 200 - 400 mm and larger fish from 500 - 850 mm (Figures 3 and 4). It is apparent that the early fishery (June 21 to August 29, 1970) is primarily smaller fish, while the larger fish enter into the fall fishery, August 30 to mid-October (Figures 3 and 4). These larger fish appear to be maturing adult rainbow trout that will spawn during the following spring. Late-season stream and aerial observations indicate these fish move downstream into the deep-water areas as stream ice forms.

Tagging and Migration:

There were 439 rainbow trout tagged during 1970 throughout the Lake Iliamna drainage. Tag recovery information accumulated since 1964 indicates a significant amount of interchange occurs between trophy fish areas in Lake Iliamna (Figure 5).

Of 42 tag recoveries made during 1970, 11 (26%) were recovered in areas other than where tagged. These tag recoveries indicate significant interchange occurs between trophy fish areas.

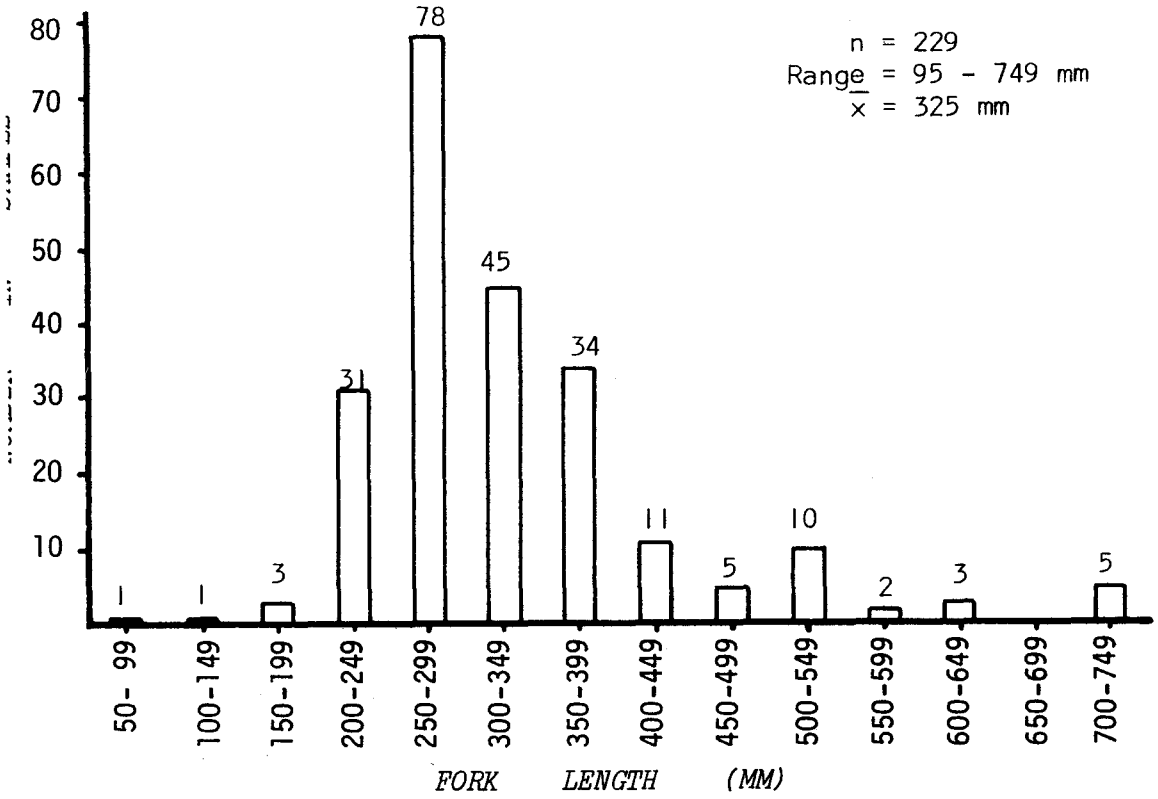

FIGURE 3 LENGTH FREQUENCY OF SPORT-CAUGHT RAINBOW TROUT AT LOWER TALARIK CREEK FROM JUNE 21 TO AUGUST 29, 1970.

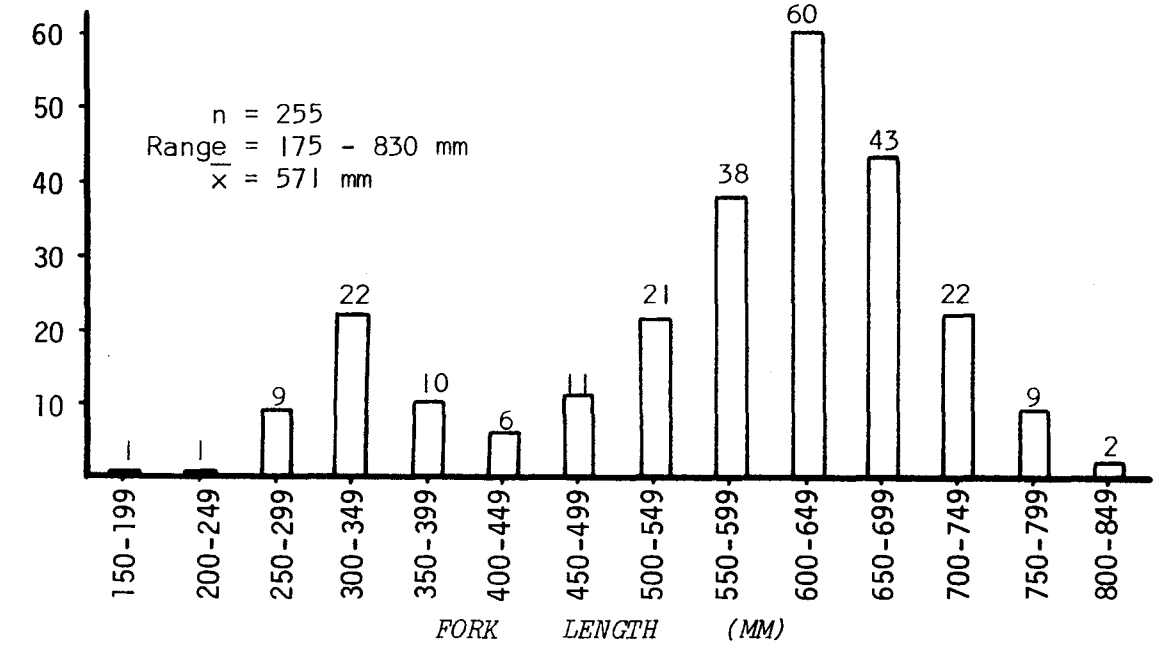

FIGURE 4 LENGTH FREQUENCY OF SPORT-CAUGHT RAINBOW TROUT AT LOWER TALARIK CREEK FROM AUGUST 30 TO OCTOBER 10, 1970.

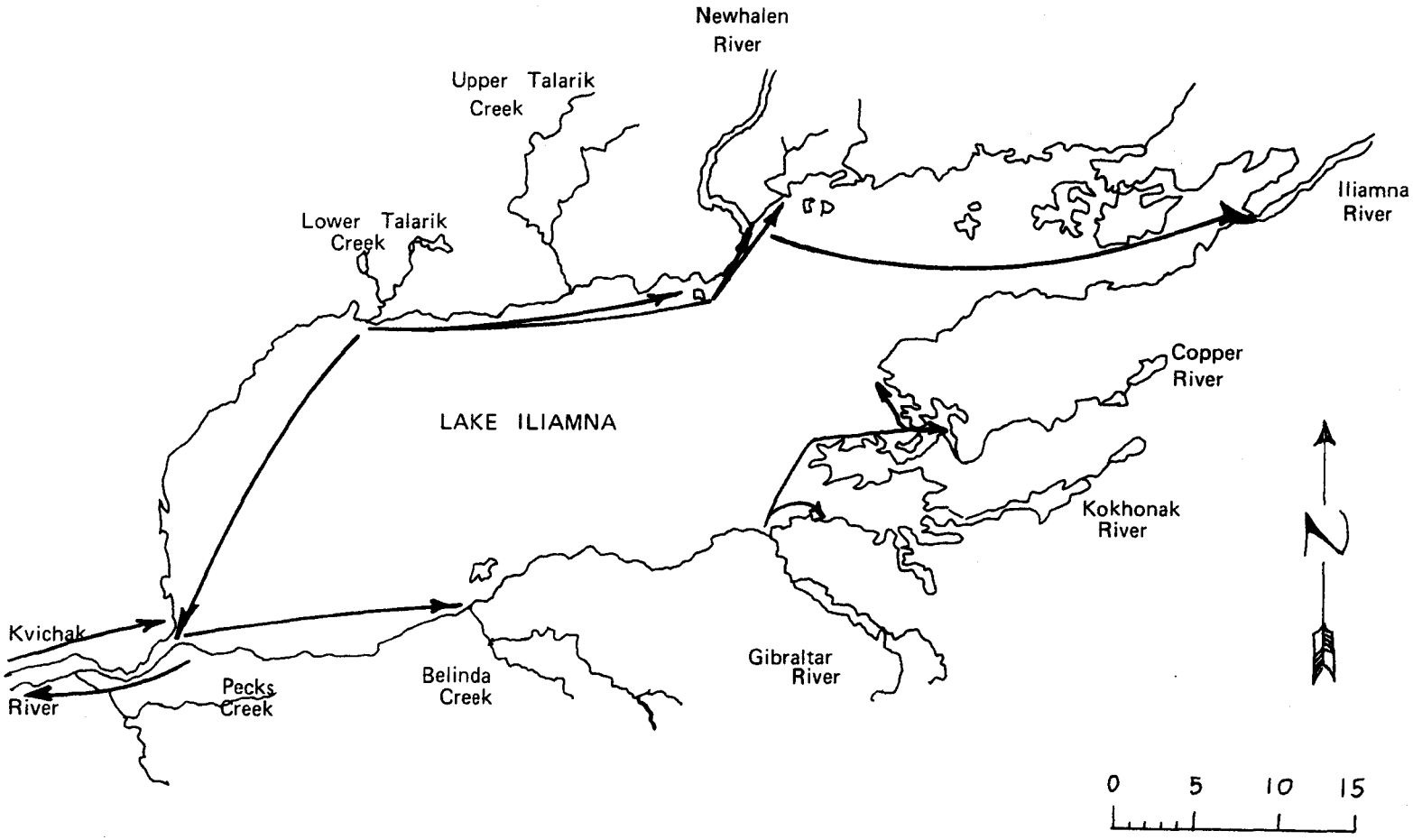

FIGURE 5 RAINBOW TROUT MIGRATORY PATTERNS IN LAKE ILIAMNA FROM TAG RECOVERY INFORMATION.

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